VOLVO

Service Manual

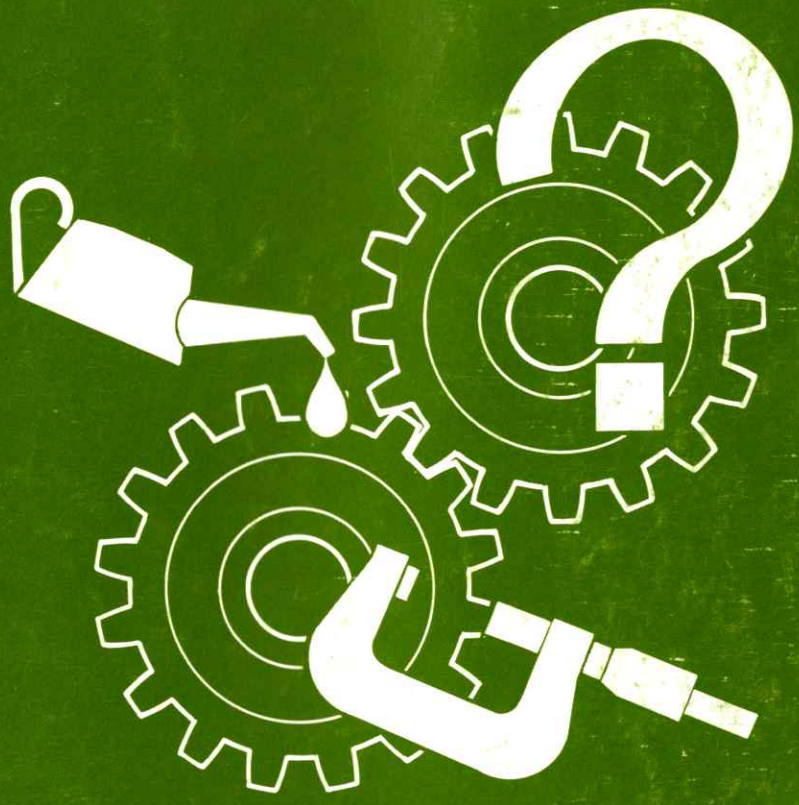
Fault tracing
Repair
Maintenance
Design
Function

Section 8(88)

SIPS bag

960 1996-

TP 8806031



Volvo Car Corporation

Cars with SRS/ SIPS (Side Impact Protection System) air bag

Warning
Cars equipped with a Supplemental Restraint System (SRS)/ SIPS (Side Impact Protection System) air bag must be treated extra carefully when repairs are being made. This is to help prevent: 1. Injuries when carrying out a repair. 2. Damage or malfunction of the SRS system.Repair to either the SRS itself or a related system or component must be carried out by an authorized Volvo workshop. Refer to the appropriate SRS/SIPS service manual for complete system information.

Is the car equipped with SRS/SIPS?

Cars with SRS are most easily recognized by the SRS letters on the steering wheel pad. If the car is also equipped with an air bag on the passenger side, the letters 'SRS' will be embossed on the instrument panel above the glove compartment. Most cars with SRS are also equipped with pyrotechnical seat belt tensioners in the B-posts.
The SIPS air bag is only installed on cars fitted with SRS (Air bag), from 1996 and on. The SIPS identifying label is attached to the windshield and on the side panels of the front seats.

Dashboard or around steering column

Take care to avoid electric wiring being pinched, frayed or pierced by screws when working on firewall, knee bolster, ignition switch, steering column casings, glove compartment, instrument panel, door sills and B-posts.

Driver's seat, centre console or carpeting at left front seat

The SRS collision sensor is located under the left front seat. Do not disconnect the collision sensor connector. Never install accessories on or near the sensor. The crash sensor connector on 1992 and earlier models must **never** be disconnected.

Repairs to steering gear and column

When carrying out repairs to the steering wheel, steering gear or column always follow the repair procedures given in the appropriate SRS service manual. The contact reel in the steering column will be damaged if the steering wheel is turned more than three turns in either direction.

Seats

The sensor unit for the SIPS air bags is located in the center of the side panels on the front seats.
The SIPS air bag will activate if the side panel receives a hard blow or pressure, it will also activate if the door is closed and there is an object between the seat side panel and the door.

Test terminal

- 1992 : An unused terminal in the fusebox is used as a hook-up for SRS diagnostics. Do not install a fuse or connect an accessory to this terminal.
1993 - 1995: Diagnostic unit B in the engine compartment is used for fault-tracing purposes.
1996 - : Data Link Connector socket in passenger compartment.

Modifications to February 1995 included

Modifications introduced after the above date are not covered in this manual.
See Service Bulletins as applicable.

Volvos are sold in versions adapted for different markets. These adaptations depend on many factors including legal, taxation and market requirements. This manual may therefore show illustrations and text which do not apply to cars in your country.
Volvo owners planning to export their car(s) to another country should investigate the applicable safety and exhaust emission requirements. In some cases it may be impossible to comply with these requirements.

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Order no: TP 8806031 (UK)
TP 8806201(USA/CDN)

We reserve the right to make alterations without prior notification.

Repair
SIPS bag labels

Warning and information labels located inside car

8800533A

On windshield

Label on the windshield combined with the SRS label. The label indicates that the car is equipped with SIPS bag.

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In the glove compartment

Label on the inside of the glove compartment lid.

Use only Volvo approved upholstery covers; other upholstery covers can impair system function. Do not mount any accessories near SIPS bag in seat back. Do not apply force to side of seat. For further information, see owner's manual.

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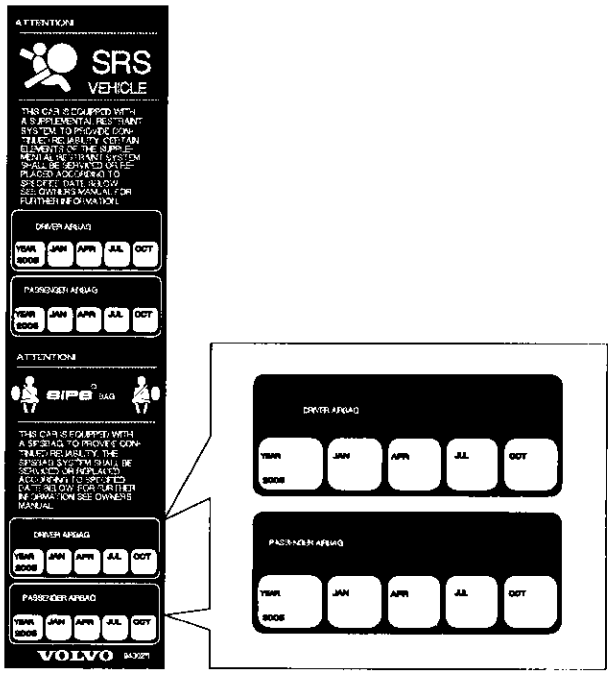
Inside of the housing cover

Warning label at sensor unit. Color orange.

Decal refers to owner's manual for further information.



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On driver's side B-post

SRS label on driver's side B-post has space provided on lower section for SIPS bag label. Two small labels indicating inspection date of left and right SIPS bags respectively are placed here.

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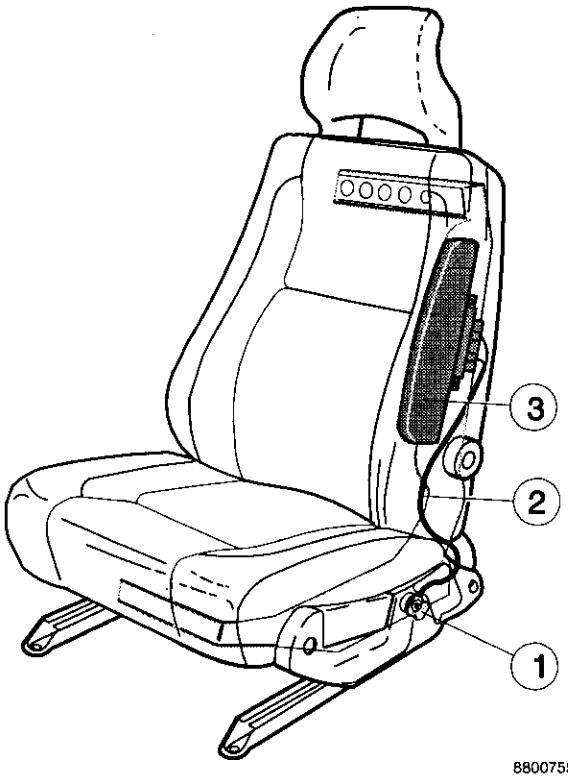
Other labels

Seat panel is marked with SIPS bag symbol.

Repair

SIPS bag, general information



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The SIPS bag is activated by a side impact to the front door and will provide improved protection to front seat passengers.

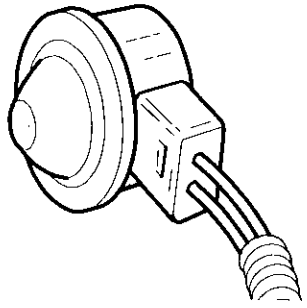
The SIPS bag system is being introduced as standard equipment on all 960 models from model year 1996.

SIPS bag installed in front seat

The SIPS bag system consists of three main components:

1. Sensor unit
2. Ignition circuit
3. Bag module

Note! Illustrations in service manual show only the left front seat throughout this manual. The SIPS bag components are symettrically located on the right side seat.



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Sensor unit

The sensor unit is located in a sensor mount in the seat frame. The mount is the part of the seat that protrudes most toward the inside of the door.

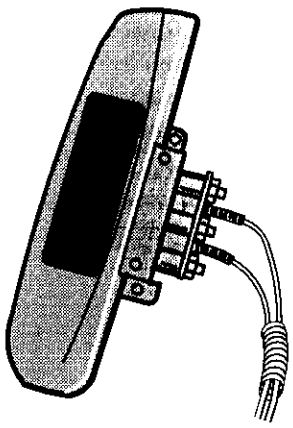
A pressure plate is mounted forward of the sensor unit. In the event of a collision, the pressure plate transfers the force from the inside door panel to the sensor unit.

Ignition circuit

The pyrotechnic ignition circuit is routed in the seat back and along the side of the seat cushion.

The ignition circuit consists of two tubes coated on the inside with a pyrotechnic material. When triggered, the signal is transmitted as a shock wave.

The tubes are covered with a black protective sleeve to protect them from mechanical damage.



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SIPS bag module

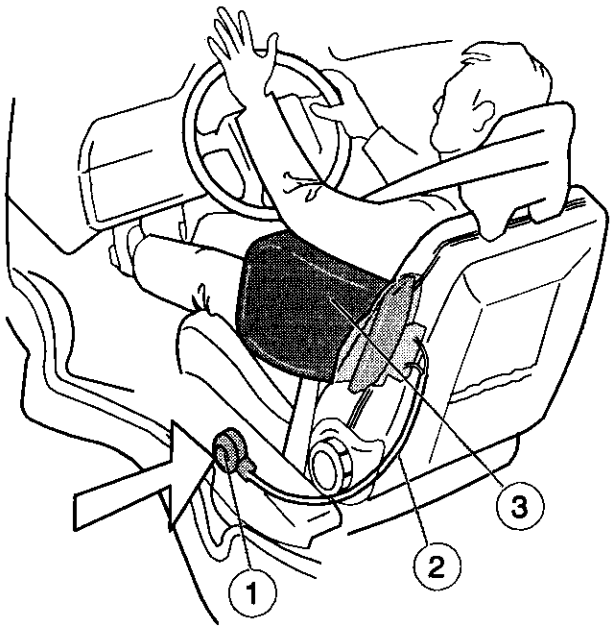
The bag module is located on the seatback frame to provide protection to the driver/passenger where the rib cage is closest to the inside door panel.

The SIPS bag

The bag is made of silicone-coated polyamide fabric and is folded under a cover. When inflated, it has a volume of about 12 liters (0.42 cu.ft.).

Gas generators

Two gas generators inflate the bag. When activated, the gas generators produce a harmless gas which inflates the bag very quickly.



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Functional description, general

The SIPS bag is a separate system in each front seat. There is no connection between the two SIPS bags. In the event of a collision, the SIPS bag will be activated only on the side of the collision.

The sensor unit has a pyrotechnic impact sensor which must be struck with a force of at lease 500 N (112 lbf) which gives a speed of 2 m/s (4.5 mph) against the sensor module of the door that is deformed. The system is calibrated to avoid unnecessary SIPS bag activation, for example from a blow to the door or a light impact with a stationary object.

The pressure plate will deform the aluminum cover, pushing a firing pin in and triggering the impact igniter. The igniter creates an impulse which is transmitted through the firing circuit as a pressure wave. When the shock wave reaches the bag module, it ignites the powder charge in the gas generators.

When released, the gas blows through a combustion chamber tube and then the gas flows into the bag. Activation of the first gas generator occurs immediately and the second is activated after a delay of about 3 milliseconds. The delay is designed to maintain the pressure and volume of the inflated bag for an adequate period of time.

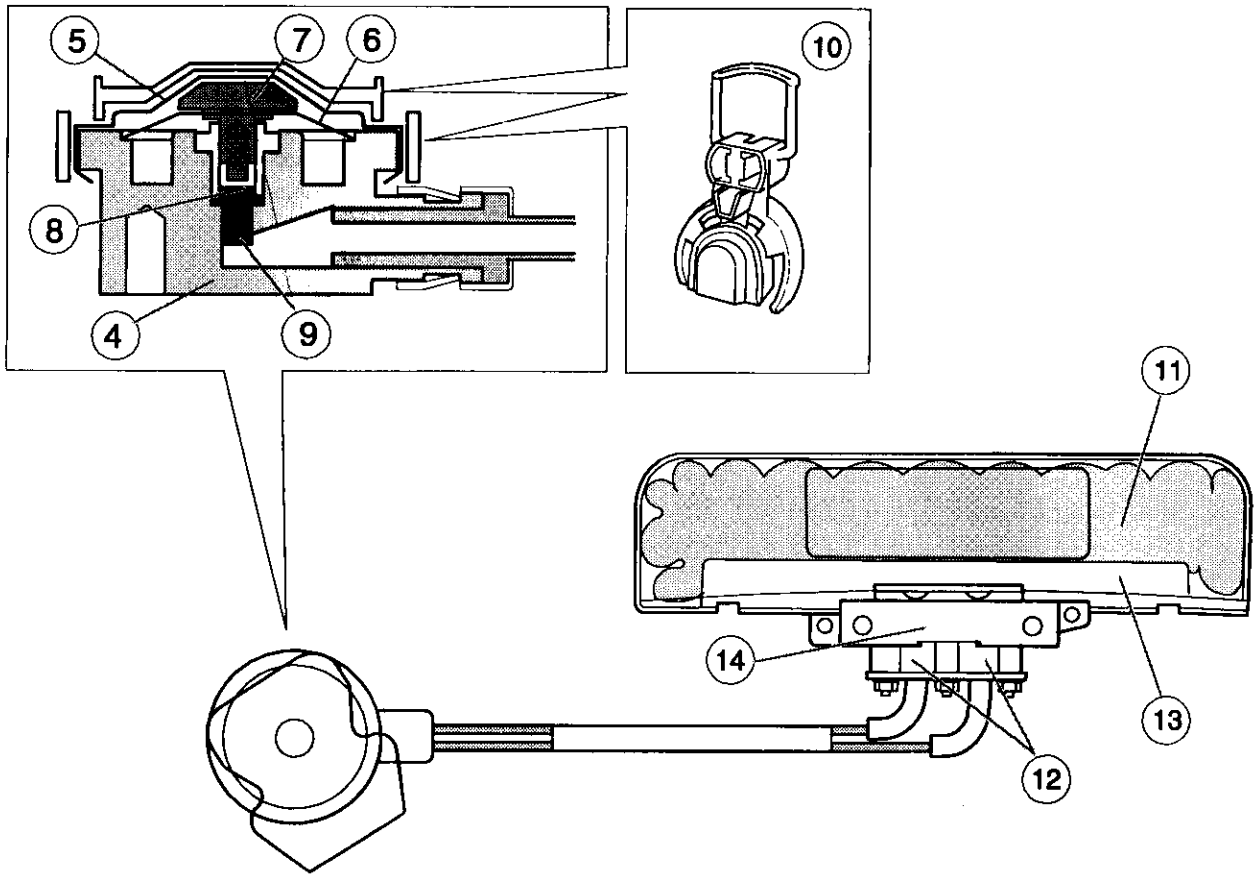
(See illustration on next page)

During inflation, the bag is forced through the bag module cover, rips open the chair upholstery seam and pushes out to inflate to its full volume. The bag inflates toward the door panel to protect the passenger's rib cage during the collision. Ventilation of the gas throught the holes in the bag fabric allows the bag to deflate slowly enough to act as a brake on the driver/passenger.

There is no diagnostic system or warning lamp connected to the SIPS bag.

Note! On a mechanical seat the cotter pin in the seat adjustment rail which prevents the seat moving further to the rear must not be removed.
Removing the pin will impair the SIPS bag function.

SIPS bag components



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Bag module components

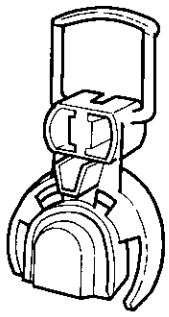
11. Air bag
12. Gas generators
13. Combustion chamber
14. Mounting bracket

Sensor module components

4. Sensor housing
5. Aluminum cover
6. Spring washer
7. Firing pin
8. Compression washer
9. Impact igniter
10. Transport safety device

Repair

A. Service procedures



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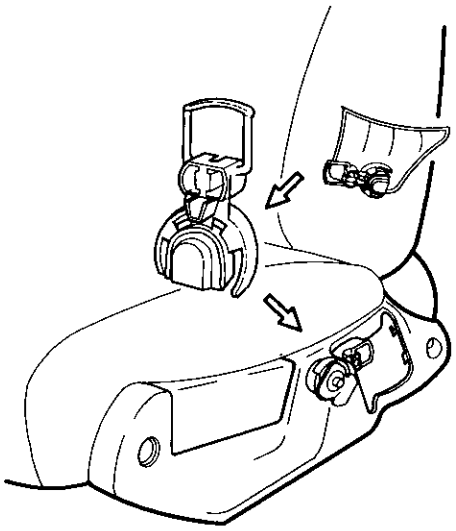
Warning! When carrying out service work on the front seat:
Always ensure the safety is engaged on the SIPS bag for the front seat which is involved.
Use the transport safety under the SIPS seat cover panel.
Never apply any pressure to the side of seat.

Transport safety device, P/N 9156562-2

During shipping and handling of a SIPS bag module or complete front seat with pre-installed SIPS bag module, the transport safety device must always be installed on the sensor unit.

When the transport safety device has been placed over the sensor module and the SIPS bag is locked, the cover panel cannot be installed. The size of the transport safety device is deliberately designed so that it prevents installation of the cover panel to prevent inadvertently leaving the transport safety device on the sensor.



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Apply SIPS bag safety

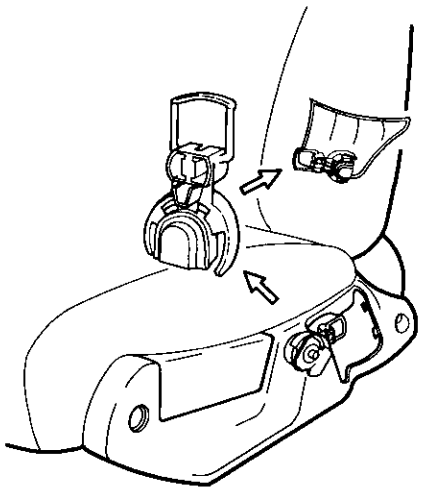
Before starting service operations

Use the transport safety device on the SIPS bag:

Remove the cover panel by pressing up.

Remove transport safety device from its holder inside the cover panel.

Install transport safety device on sensor unit.



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Arming the SIPS bag

When service operations are completed

Do not forget to arm the SIPS bag:

Remove transport safety device from sensor module.

Place transport safety device in holder on inside of cover panel.

Install cover panel.

B. When should the SIPS bag be replaced?

8800765A

In the event of a side collision

SIPS bag released in otherwise undamaged seat.

- See chapter D.

Other damage to seat other than from SIPS bag.

- See chapter C.

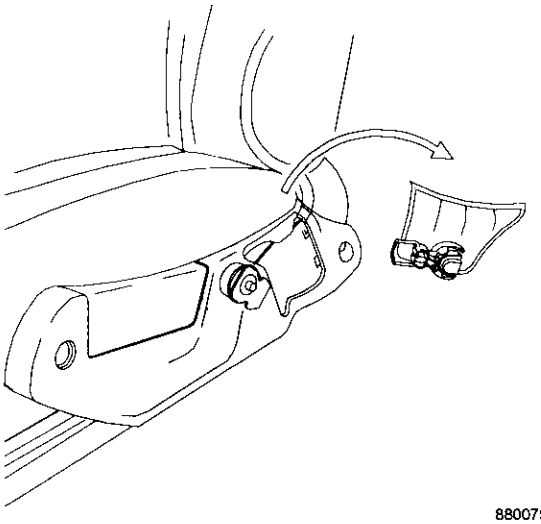
SIPS bag not activated, inspection.

- See chapter E.

Service replacement

- See chapter D.

C. Replacement of front seat equipped with pre-installed SIPS bag



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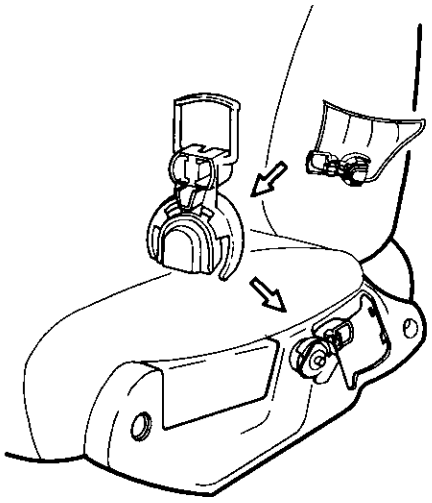
Warning! SIPS bag must not be repaired. Replacement of deformed front seat with pre-installed SIPS bag.

C1

Apply SIPS bag safety:

Remove cover panel.



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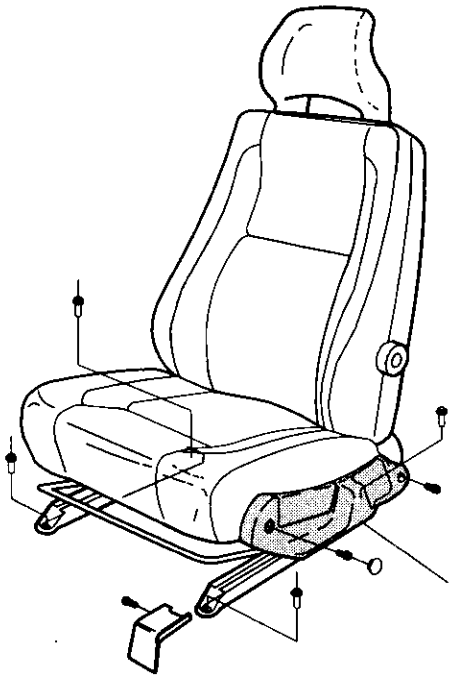
Remove transport safety device from inside cover panel.

Install transport safety device on sensor module.



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Remove seat belt from seat mounting.
(Screw on outer side of seat)

Move seat to rearmost position.

Remove cover panel over the left seat adjustment rail.

Remove seat bolts at front edge.

Move seat to furthest adjustment point to the front.

Remove cover panels over the seat adjustment rails.

Remove bolts at rear edge.

C2

Turn ignition off.

Disconnect cable from negative battery terminal.

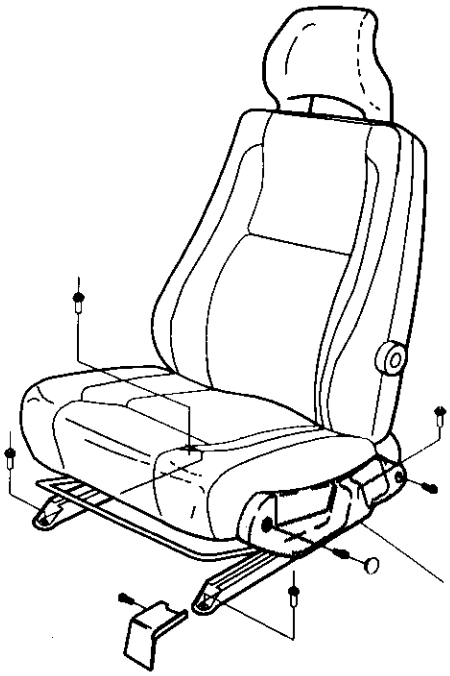
Disconnect the connector below the left seat adjustment rail.

Move seat to the rear until the guide lugs in the seat free off.

Lift seat straight up.

Remove seat from car.

For further directions regarding replacement of parts on front seat, see Service Manual "Section 8 (82-86, 88) Interior, exterior 700/900- 1982-".



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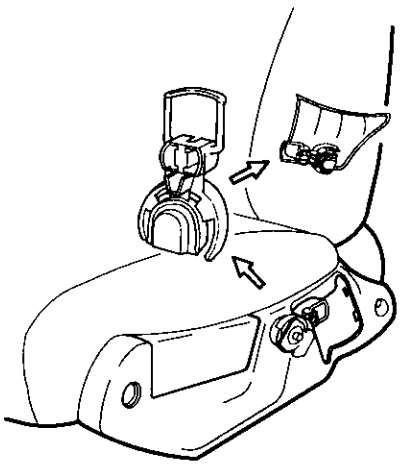

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C3

Installing the front seat

First make sure that the SIPS bag safety on the new front seat has been applied by installing the transport safety device on the sensor module.

Install the seat in the reverse order to that described under C2.

Tightening torques:

Seats/floor: 50 Nm (37 ft.lbs)

Belt: 30 Nm (22 ft.lb.)

Note! On a mechanical seat the cotter pin in the seat adjustment rail which prevents the seat moving further to the rear must not be removed.
Removing the pin will impair the SIPS bag function.

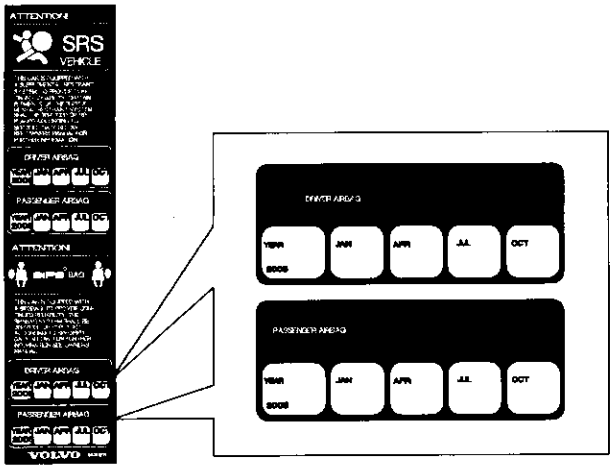
C4

Arming the SIPS bag

Remove transport safety device from sensor module.

Replace the transport safety in the cover panel.

Install cover panel.



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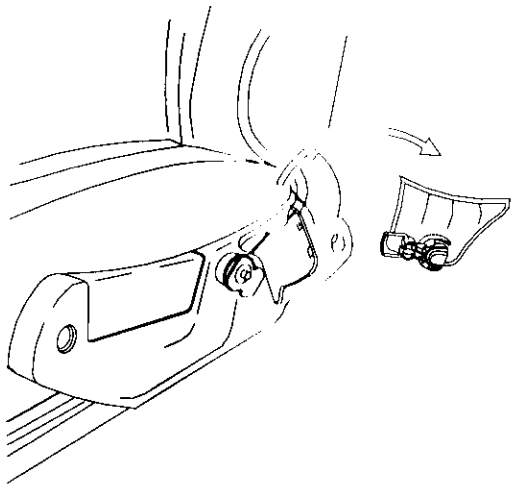
Change label to indicate new date for SIPS bag, left and/or right side. Located at driver's side B-post.

The label is supplied with the new SIPS bag seat.

D. Replacement of SIPS bag in front seat

SIPS bag activated or service replacement



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Warning! SIPS bag must not be repaired. The SIPS bag is always replaced as a complete unit, consisting of sensor module, ignition circuit and bag module.

Important! When replacing the seat back upholstery, use only Volvo Original spare parts seat upholstery.

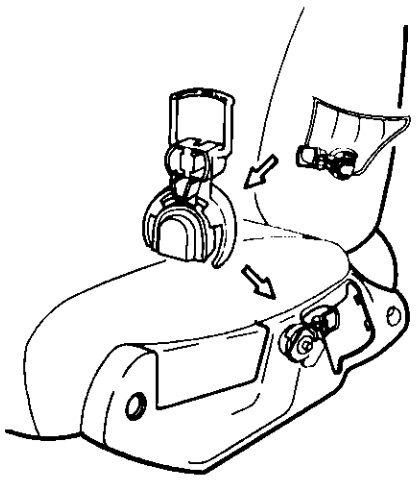
Use only Volvo Original accessory upholstery.

If SIPS bag was not released the safety must be applied.

D1

Apply SIPS bag safety

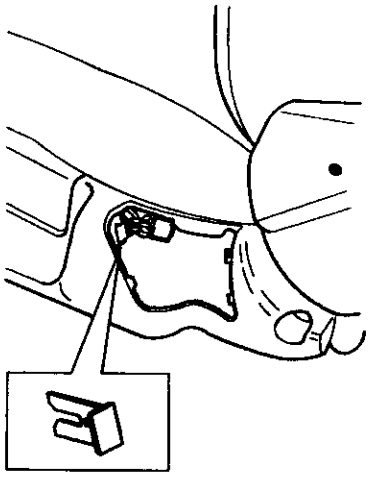
Remove cover panel on the control panel.



8800842A

Remove transport safety device from inside cover panel.

Install transport safety device on sensor module.



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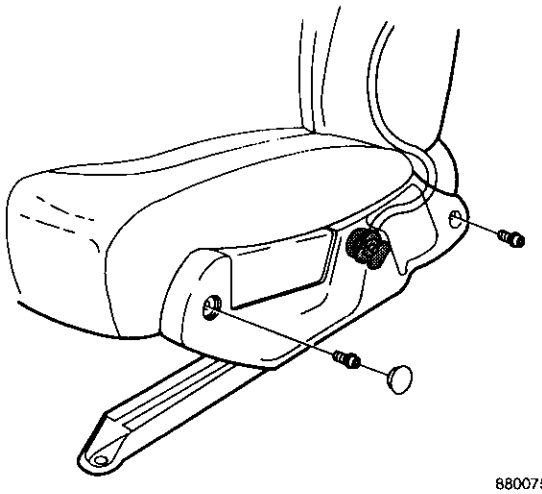
Remove the seat panel clips (white).

D2



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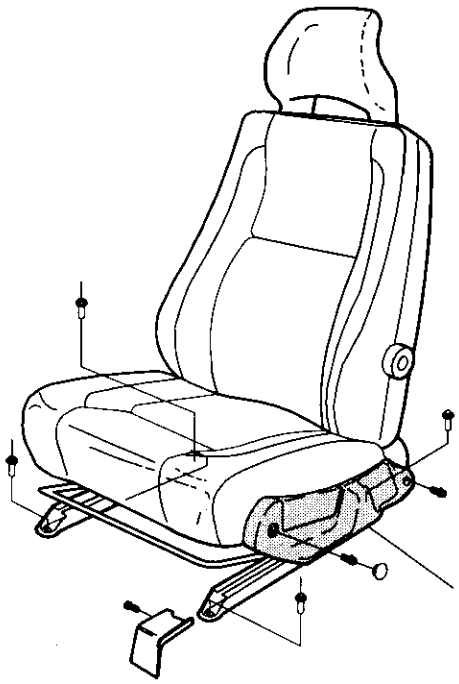
Remove front seat.

Remove:

– control panel or seat storage compartment.
Fastened with two Torx 25 screws.



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– seat belt from seat mounting (bolt on outside of seat).
– panel over front edge of seat adjustment rail.

Move seat to rearmost position.

Remove cover panel over the left seat adjustment rail.

Remove seat bolts at front edge.

Move seat to furthest adjustment point to the front.

Remove cover panels over the seat adjustment rails.

Remove bolts at rear edge.

Turn ignition off. Disconnect cable from negative battery terminal.

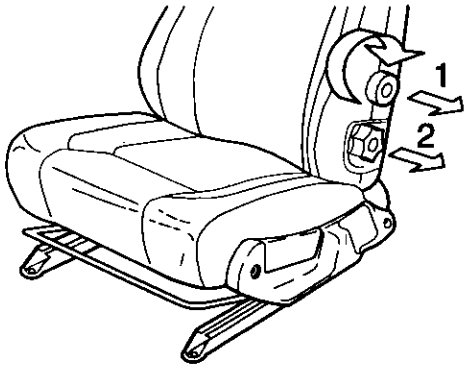
Disconnect the connector at the left seat adjustment rail.

Move seat to the rear until the guide lugs in the seat free off.

Lift seat straight up.

Remove seat from car.

For further directions regarding replacement of parts on front seat, see Service Manual "Section 8 (82-86, 88) Interior, exterior 700/900- 1982-".



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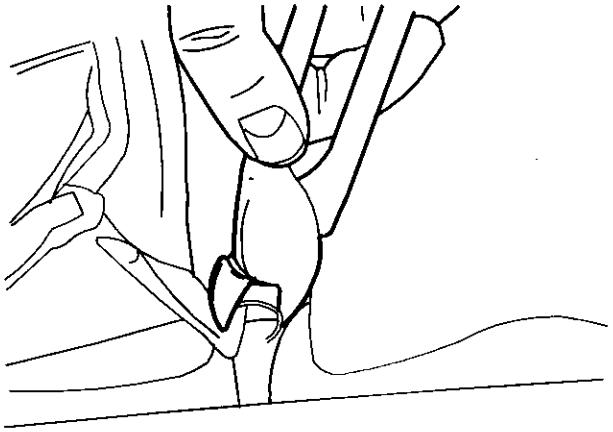
D3

Remove upholstery from seat back

Remove:

– knob for adjusting the seat back rake (2).
(applies to manually adjusted seat).

– knob for lumbar support adjustment (1).
Screw out counter-clockwise until it stops. Pull outward hard.



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Remove the four staples in the under edge of the seat upholstery.
Use cutting pliers.

Pull up the upholstery to the middle of the seat back.

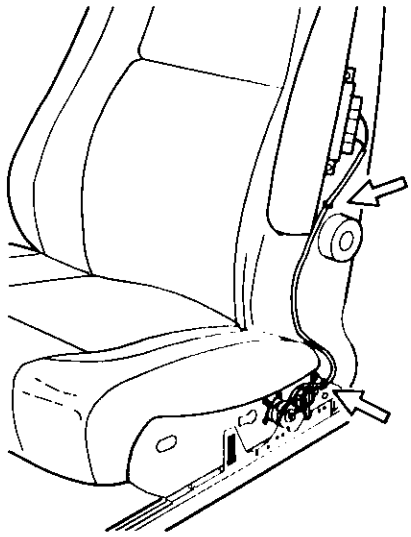
Remove two staples.

Detach two rubber bands with hooks.

Pull up upholstery far enough so the SIPS bag module can be seen.

For further directions regarding replacement of upholstery or other parts on front seat, see Service Manual "Section 8 (82-86, 88) Interior, exterior 700/900- 1982-".

Note! The red transport safety must be in position throughout these operations.



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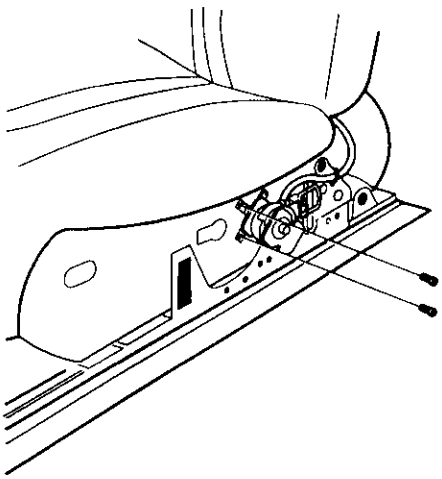
Remove SIPS bag from seat

D4

Remove ignition cable

Note routing of ignition cable and location of cable ties.

Cut cable ties (2).



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D5

Remove sensor module from seat frame.

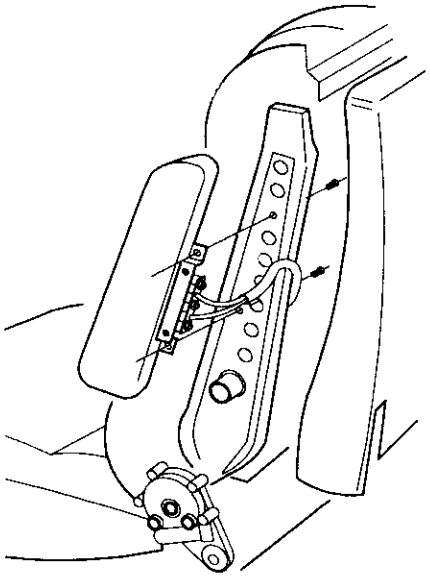
Remove:

- pressure plate and sensor module.
  Two Torx 25 screws.

- sensor from the pressure plate.
  One Torx 25 screw.

D6

SIPS bag module



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Remove:

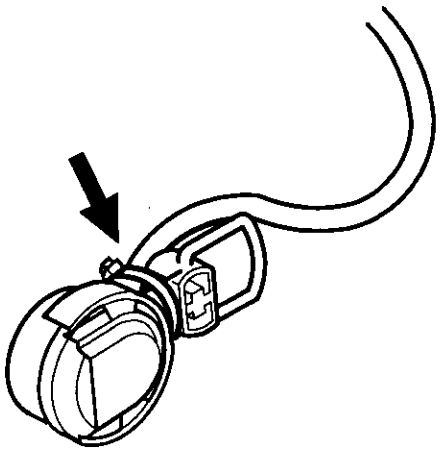
– bag module.
  Two Torx 25 screws.
  Note! The screws are removed from the inside.

D7

SIPS bag from seat.

Remove entire SIPS bag (sensor module, ignition circuit and bag module) from seat.

Install SIPS bag in seat



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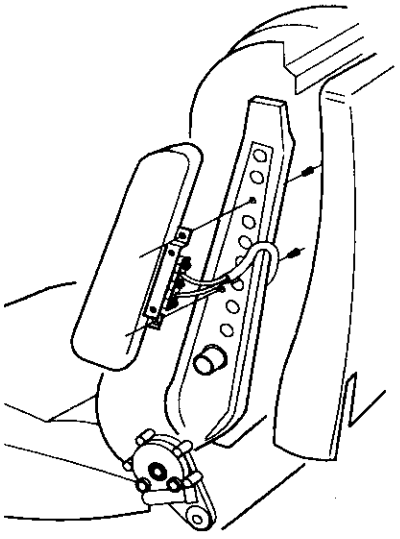
Make sure that the new SIPS bag is locked with transport safety device attached to sensor module.

Note! As a replacement part the transport safety is attached to the sensor module with a cable tie.

D8

SIPS bag module



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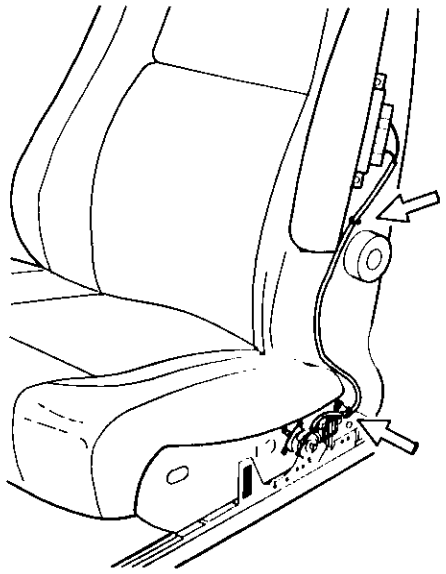
Install:

– the bag module on the seat back frame.
  2 Torx 25 screws.

If SIPS bag was activated the attachment screws for the bag module should be replaced with new ones.

Use the same type and quality of screws as the ones replaced.

Tightening torque for bag module: 6.0 Nm (4.5 ft.lbs)



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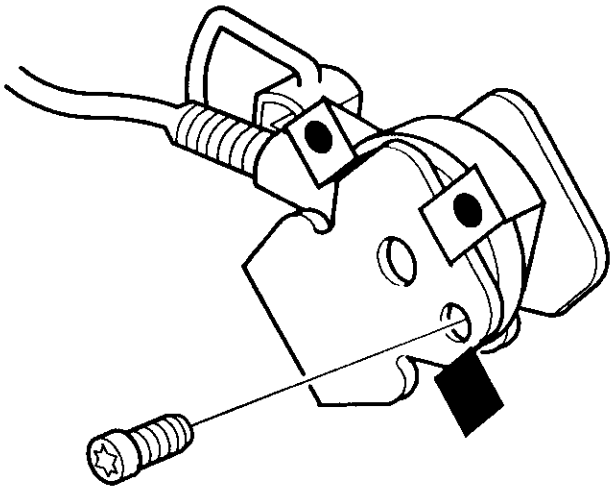
D9

Sensor

Insert sensor between the seat back and the seat frame.

Install cable ties (2) as shown in the illustration.



8800843A

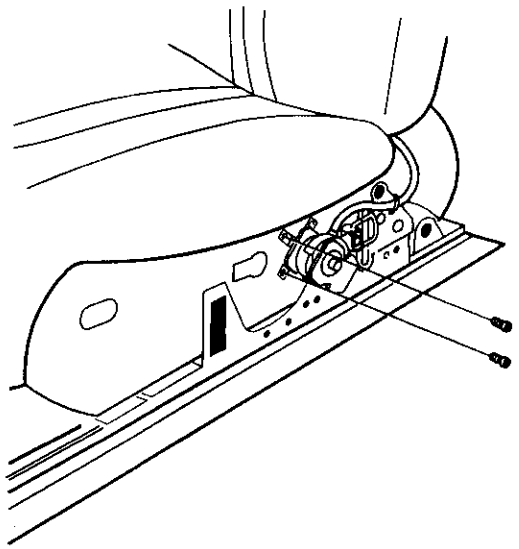
D10

Sensor module

Cut cable ties on the transport safety.

Install:
– sensor module on the pressure plate.
(One Taptite screw max. 12 mm (0.48 in.) long)

Torque: 6.0 Nm (4.5 ft.lbs)



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– pressure plate in the seat.
(2 screws).

Torque: 4.0 Nm (3.0 ft.lbs)

Important! When repairing after a collision: Replace pressure plate with a new one. Check/replace spacer block in door.
For service replacement: Use the existing pressure plate.

D11

Seat upholstery on seat back

Install upholstery in reverse order to D3.

Pull down the upholstery to the middle of the seat back.

Fasten rubber bands with hooks.

Install the two staples.

Pull down remaining upholstery.

Install the four staples in the lower edge of the seat back.

Use special pliers, P/N 1158962-9, to attach staples.

Install the knob for the lumbar support and seat back rake adjustment (manual seats).

> **Important!** When reupholstering seat back, use only Volvo original or Volvo approved seat upholstery for SIPS bag.

D12

Front seat in car

Install seat in opposite order to D2.

Install seat in car.

Connect the connector at the left seat adjustment rail.

Connect the battery minus lead to the battery.

Move the seat to rearmost position.

Screw the seat adjustment rails in place at the front edge:

Torque: 50 Nm (37 ft.lbs)

Move the seat to furthest forward position.

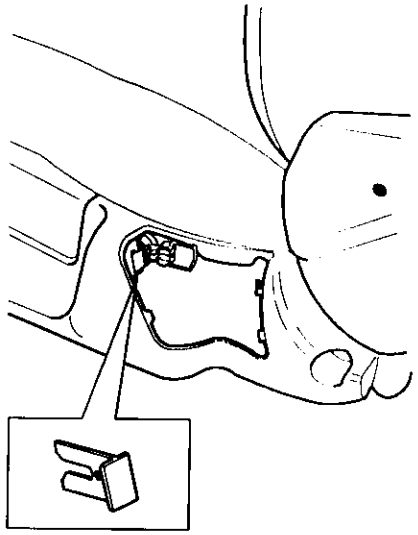
Screw the seat adjustment rails in place at the rear edge:

Torque: 50 Nm (37 ft.lbs)

Install protective covers on the seat adjustment rails.

Install seat belt in the seat frame.

Torque: 30 Nm (22 ft.lbs)

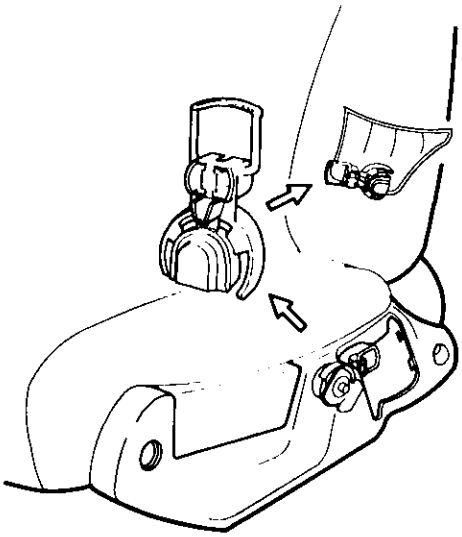


8800759A

D13

When front seat is in place

Install seat panel clips.



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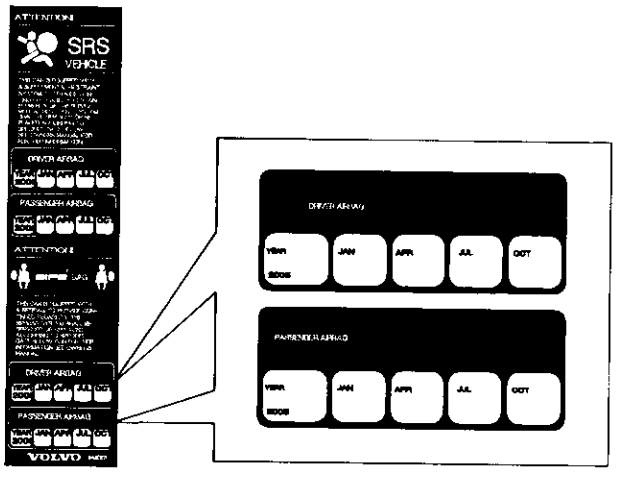
Do not forget to arm the SIPS bag:

Install transport safety device on inside of cover panel.

Install cover panel.

Important! On mechanical seat the cotter pin that prevents the seat moving past the rearmost position must not be removed.
Removing the pin will impair the SIPS bag function.



8800531A

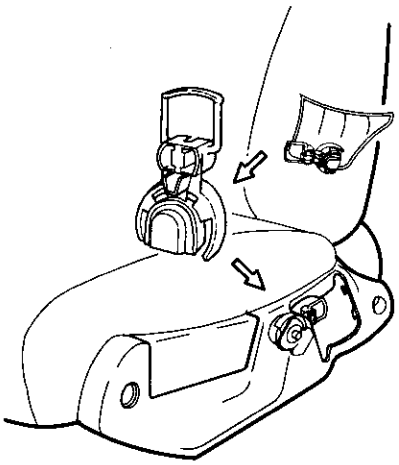
Change label to indicate new date for SIPS bag, left and/or right side.

Located at driver's side B-post.

The label is supplied with the new SIPS bag module.

E. Visual inspection of SIPS bag

If SIPS bag was not released in a side collision



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In the event of minor collisions, when front seat is otherwise intact, a visual inspection of the SIPS bag is necessary.

E1

Apply SIPS bag safety:

Remove cover panel.

Remove transport safety device from its holder inside the cover panel.

Install transport safety device on sensor module.

Remove control panel or seat storage compartment.

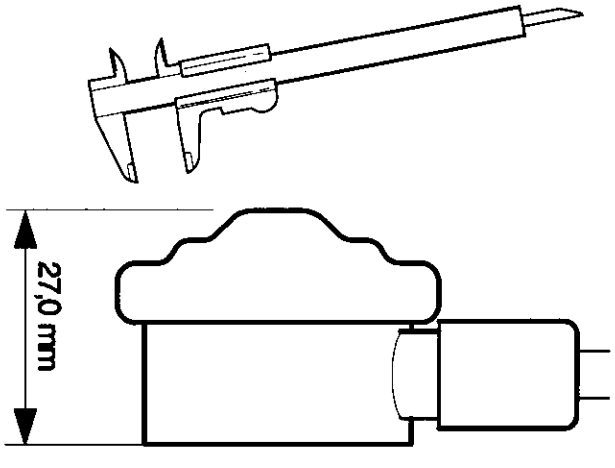
E2

Inspect SIPS-bag system

Inspect ignition circuit:

Make a visual inspection of the exposed portion of the ignition circuit on the seat.

If there is visible damage to the ignition circuit outer sheath: Remove sheath and make sure that ignition circuit is not damaged.



6800527A

Inspect sensor module:

Remove sensor module, see step D4.

Remove transport safety device from sensor module.

Use caution when SIPS bag is armed!
Do not exert any external pressure on sensor module.

The aluminum cover on the sensor module must not be dented or buckled.

Measure the height of the sensor module as shown. The height must not be less than **27.0 mm** (1.06 in).

Install transport safety device on sensor unit.

If SIPS bag is OK: Install in reverse order.

If any part of the SIPS bag is defective: Replace with a complete new SIPS bag according to chapter D.

Check that the SIPS block behind the door panel is intact and correctly installed.

F. If car is to be scrapped

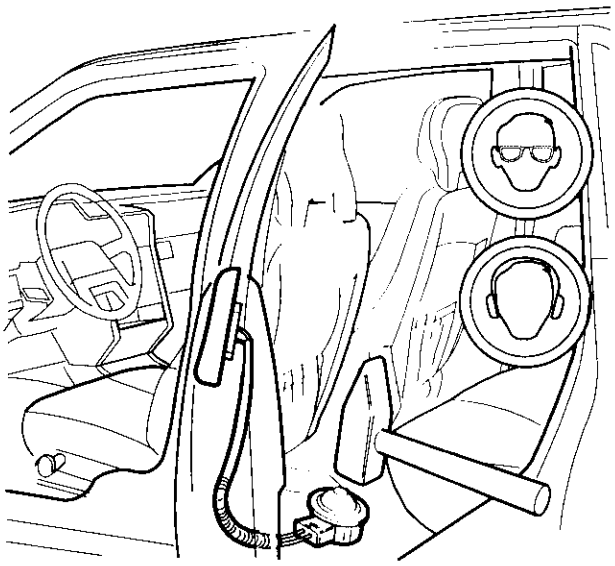
If the car is to be scrapped, the SIPS bag should be released in place in the car, see operation F1.

If a removed SIPS bag is to be scrapped, the SIPS bag module should be placed in a vise before release, see operation F2.

Warning! Make sure that no one is in the car and that no one is in front of the SIPS bag when the SIPS bag is released.
Releasing an unclamped or loosely fastened SIPS bag can cause personal injury.

Note! Safety glasses and hearing protection must be used during this procedure.

F1



8800528A

If car is to be scrapped

Turn ignition off.

Make sure that SIPS bag is securely fastened to the seat and that there are no loose parts around the SIPS bag.

Attach transport safety device to sensor unit, see chapter A.

Remove sensor module and free ignition circuit from cable ties and clips, see operation D4.

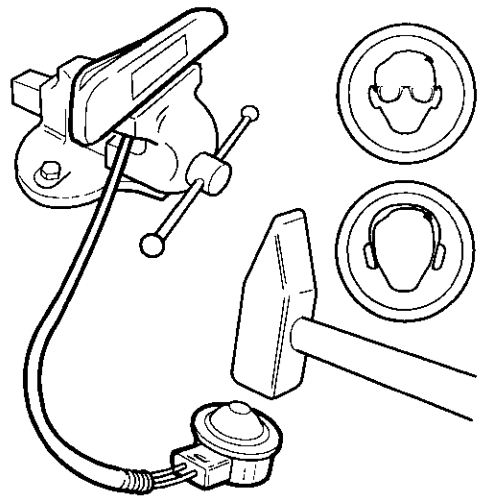
Close front doors and windows.

Pull sensor unit to floor behind seat.

Remove transport safety device from sensor module.

Stand outside the car and hit the middle of the sensor module with a hammer.

F2



8800529A

If a removed SIPS bag is to be scrapped

Make sure that transport safety device is on sensor module.

Lock SIPS bag module in a vise, so that bag is aimed away from sensor module.

Make sure that bag module is securely held in vise and that there are no loose parts around the module.

Remove transport safety device from sensor module.

Point the bag away from the sensor module. Stand as far from the bag module as possible.

Hit middle of sensor unit with a hammer.

Comments

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